

Appl. No. : 10/772,044
Filed : February 4, 2004

REMARKS

Claims 1 and 5 are rejected under 35 U.S.C. Section 103 as unpatentable over Sircar in view of JP 61-119645.

Claim 1 has been amended to recite that the homogenization of the ingot "is regulated to precipitate sufficient Mn prior to extruding and drawing so as to produce said 1 IACS% or less conductivity difference in a lengthwise direction of the hollow material."

One aspect of the claimed invention is to regulate the homogenization conditions which reduce preferential corrosion in port hole extrusion relating to aluminum alloy containing 0.8-1.5wt% Mn, 0.1-0.7wt% Fe, 0.03-0.6wt% Si, and optionally one or more of 0.00-0.45wt% Cu, 0.0-0.3wt% Mg, 0.0-0.3wt% Cr, 0.0-0.1wt% Ti, 0.0-0.5wt% Zn, 0.0-0.3wt% Zr, 0.0-0.3wt% Ni, and the balance Al and any unavoidable impurities. Preferential corrosion originates from the difference in the structure of the welding portion of port-hole extruded material. The present inventors have found (as described on page 22, line 12 through page 27, line 21 of the specification as filed) that precipitating the Mn with controlled homogenization greatly increases the uniformity of conductivity of the extruded material and thus greatly reduces the problem of preferential corrosion.

The problem of preferential corrosion is not stated anywhere in the cited references mentioned by the Examiner. The claims, as detailed in the specification, show that the preferential corrosion in the welding portion can be reduced by precipitating in advance the Mn-contained compounds with ingot homogenization treatment prior to extrusion.

Preferential corrosion generally refers to the fact that, in the case of contacting two different metals, the difference in electric potential makes one of the above two metals corrosive preferentially. Methods for providing overall corrosion resistance are not necessarily effective in minimizing the difference in corrosion resistance by material location of the welding portion and non-welding portion in the same material. The present invention helps resolve the problem of differences in corrosion resistance between the same materials, namely, corrosion resistance of the welding portion and non-welding portion of port-hole extruded material. This problem is not contemplated at all by the prior art of record.

And then, it is clear, as shown in Table 7 of the specification, that corrosion of extruded material occurs at the front end of the extrusion more easily than at the rear end of the extrusion.

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Therefore, it is necessary to control the precipitation condition of the material to ensure preferential corrosion across the total length. To ensure preferential corrosion across the total length of the extruded material, it is necessary to limit the lengthwise extrusion dimensions (longitudinal direction for extrusion) of electric conductivity. Thus, the claims include limitations on the lengthwise consistency of conductivity. This is not taught or suggested in the prior art.

Furthermore, regarding the general corrosion resistance of aluminum alloys, it is known that AA3000 series 3003 alloys or Al-Mn series alloys are generally better in corrosion resistance than 1000 series alloys such as AA1050 or AA1100. However, reducing preferential corrosion resistance requires specific homogenization techniques, not just material selection.

As shown in Table 2 of the specification, the process of homogenization in general will not necessarily produce sufficient Mn precipitation. No reference of record teaches or suggests that a homogenization treatment should be performed prior to port hole extrusion that accomplishes this result as set forth in Claim 1. In fact, although Sircar mentions annealing, the applicant sees no mention of homogenizing in Sircar at all.

Sircar and JP '645 do not teach "substantially the same process" as amended Claim 1 because neither teaches controlling any homogenization to precipitate Mn so as to produce a conductivity profile that is consistent within 1 IACS%. The products produced by the processes of Sircar and JP '645 alone or in combination therefore cannot be expected to be the same as those produced in accordance with Claim 1, especially regarding the consistent conductivity profile along the length of the hollow material.

It is respectfully submitted that Claim 1 as amended is allowable over the prior art of record. Claim 5, being dependent on Claim 1, is allowable for at least the same reasons. Reconsideration and withdrawal of the rejections is respectfully requested.

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Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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